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172 of metals to the island. Bronze Age pottery is less highly finished than the Neolithic ware, but although the two are certainly distinct, there are transitional forms.

From an ethnological point of view it would appear that the Bronze Age, or the end of the Neolithic Age, was in many places a crucial period. It is difficult, however, to parallel this in Malta by linking up the osteological and the archæological material. As we shall hope to show later, the Megalithic people in Malta appear to be very distinct from the later inhabitants, and to present certain Armenoid characteristics. Sir Arthur Evans[1] has pointed out that there was a western colonial movement from the mainland of Greece towards the close of the period which he has termed Late Minoan III. There is evidence of such a movement in cemeteries near Syracuse. Up to the present, however, there is no evidence of Malta being connected with the East at so early a date. It has further been suggested that at some period in the early history of the island a complete destruction of the old population took place.

The sherds from Kúllilia appear to be similar in fabric and design to those of the Hal Tarxien Bronze Age. During the so-called "Phœnician" period we have cultural evidence of connection with the Ægean and North Africa, and it would appear that then, if not earlier, the final shaping of the present population was taking place, and that the mixed "island people" of the Eastern Mediterranean were sufficiently firmly established to swamp any further immigration of invaders belonging to a pure Mediterranean strain.

● [144] The Punic influence, though culturally no doubt of importance, does not seem to have altered the population physically, and though at this time the connection with North Africa was undoubtedly close, it was not sufficiently strong to counteract the change wrought by the sea rovers from the islands, and to restore a type similar to that of Neolithic times.

175 C48 Until the Roman occupation at the end of the third century B.C. Malta appears to have been closely connected with North Africa. Rome held the islands as a military or semi-military outpost until nearly the end of the second century A.D. The period usually known as "Roman" in Malta should be more correctly described as Romano-Maltese; although Rome was the ruling power and much Roman culture was introduced, there are few references to Malta in Roman literature, and from an ethnological point of view the island was certainly working out its own salvation.

The archipelago was given practical autonomy and made a municipium about A.D. 177. On the division of the Empire, in A.D. 395, the islands were taken over by the Eastern Empire, to which they were certainly ethnologically akin. Invasions of barbarians may possibly have occurred, but when the Arabs captured the islands in 870 they found a Byzantine garrison in occupation. Robert of Sicily, with a

[1] "Prehistoric Tombs of Cnossos," *Archæologia*, LIX, p. 107.

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extremely different, due possibly to differences in environmental conditions or dietary habits.[1]

Pigmentation figures, then, seem to support a conclusion which had already been arrived at on other grounds, namely, the relationship between the Maltese and the mixed Armenoid population of the Eastern Mediterranean.

Coefficients of Correlation.

The coefficients of correlation which have been worked out refer only to those figures which are utilized for indices. Unfortunately some of the series are too small for this treatment. For the most part the coefficients of correlation do not suggest, in the four series of characters which were selected, any great differences. There is a significant difference between the correlation of the total facial height and the bizygomatic breadth in the male and female, a condition which is probably due to the more developed masticatory apparatus of the male. The difference between the correlations of head length and head breadth between the urban districts and Siggewo is of interest when we compare the means and the coefficients of variation of those measurements absolutely, and confirms to a certain extent our hypothesis that Siggewo possibly represents a local deviation from the normal Maltese type. Differences between the urban district females and the rural district females are found in four characters (total facial height, bizygomatic breadth, nasal height and nasal breadth) suggesting conditions one of which can be referred to food and the other to climate, but the absence of confirmatory evidence in the males makes it necessary to withhold any conclusions until further correlations have been worked out.

Looking at the figures generally, the correlated characters show remarkably little correlation, and the absence of real differences between the various groups goes far to suggest that the differences between the various parts of the archipelago are not in any way of fundamental importance.

The coefficients of correlation on the skulls are unsatisfactory, owing to the paucity of material. The extremely small correlation between glabello-occipital length and greatest breadth from the Chapel of Bones is of an unusual character. It can hardly be illusory when worked out on so large a series, but the explanation is not apparent from our present data.

VII.—Racial Problems.

The racial problems connected with Malta are extremely difficult to deal with, because they raise certain social questions. Historically the matter may be summarized briefly as follows.

[1] Both Meligala and Mani are situated in the Peloponnese.

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The megalith builders, who may be conveniently termed "Malta first race" (culturally "Local Neolithic"), are certainly akin to the early, and, indeed, present inhabitants of North Africa and to those of Sicily, Corsica, Sardinia, and Spain, and belong to what is usually known as the Mediterranean race, differing from many skulls of this type in having a shorter nasal aperture, and therefore a bigger nasal index.

The inhabitants of the Barbary coast have been discussed at great length by Bertholon and Chantre (41). A series of 124 skulls (unfortunately the sexes have been mixed) from Carthage, dating from the sixth to the third century, B.C., shows a close resemblance to the "Neolithic" skulls found in the Hypogæum at Hal Saflieni. The low standard deviations, even when the sexes are mixed, *e.g.* cephalic index, mean 74·73 and 2·94 σ[1] suggest the absence of any Armenoid blood in Carthage, and a small series (35) of modern crania (♂ + ♀) from Tunis show almost identical figures (*e.g.* cephalic index mean 74·31 and 2·96σ).

In Sicily from Eneolithic times onward the population is of the same type. Even in a series of two hundred modern Sicilian skulls, Giuffrida Ruggeri found only 5 ♂ and 2 ♀ of the Eurasiatic form, one was doubtful. Apart from the small series from Anghelu Reju, the modern inhabitants of Sardinia and Corsica appear to belong to this type (46).

It is remarkable that wherever we find Mediterranean man he shows little variation, suggesting a primitive stock which has maintained itself in certain areas.

The "Neolithic" Maltese (Malta first race) can have differed but little from our own Neolithic ancestors, except in the form of the nasal aperture. The modern people differ from the modern British type in head form, in stature, and in the general build of the skeleton. It would seem as though these differences were of essential importance. The Maltese appear to be a mixture of a people who certainly form a part of the population of the British Isles, but there is a second element that is not akin. It is noticeable that, as would appear from recent work, the Neolithic element seems not to have been entirely swamped in the British Isles; on the other hand we have shown that in spite of continuous influx of Mediterranean blood, it has not been able to dominate the population in Malta. Possibly the geographical conditions of the island are particularly favourable to the continuance of the race which has since developed.

These megalith builders are succeeded by a different type of folk, exhibiting Armenoid characteristics (Malta second race). The most interesting question of Maltese anthropology is, where did these late arrivals come from, and when did they come to Malta. Early skulls are unfortunately missing at present in the Mediterranean area. The immigrants are not racially allied to the people of Italy, Sicily, or the Barbary coast; they differ fundamentally from what appears to be the type

[1] σ is used throughout this paper as a symbol for "standard deviation."

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in Albania; they resemble some of the elements in the early population of Cyprus, but the closest parallel appears to be Crete, some parts of Greece, and the Islands of the Sea. Such evidence as we have suggests an immigration from the eastern part of the Mediterranean. We have already argued elsewhere (38, p. 92) that even early in the Bronze Age there existed in the Eastern Mediterranean a mixed stock consisting of elements of Armenoid and Mediterranean man, and suggested that such mixing possibly took place as early as the end of the Neolithic period. It seems possible that these people arrived in Malta at a much later date. Unfortunately the gap is a long one. Plenty of Neolithic material has survived, we have a few scattered finds in the long intervening periods, and a small and scarcely adequate number of crania of the Romano-Maltese time.

We have argued above that the Malta second race cannot have come from anywhere but the Eastern Mediterranean, and that they show no affinities with the Carthaginians. We have at present, however, no satisfactory cranial evidence from Carthage earlier than the sixth century B.C. We know, on the other hand, that Carthage was closely connected in earlier times with the great trading cities of the Syrian coast. The conditions in Malta and North Africa are extremely different, and whereas it might be impossible for people of Armenoid type to establish themselves on the coast of North Africa, this argument would not affect the possible establishment of the same type in a comparatively isolated island. We know, further, that a people of undoubtedly Syrian origin, namely the Jews, have, in Tripoli, to a large extent, lost their typical head form, while retaining their religious, social, and, it would appear, at least some of their physical characteristics. It is possible, therefore, that the origin of the Malta second race must be looked for in Phœnician traders of Armenoid origin, who may have come either directly from the Eastern Mediterranean or indirectly via Carthage.

There can be little doubt that such a change must have taken place at a comparatively late date in the history of Malta, but it would seem extraordinary that an invasion of any such race could have entirely altered the population of an island. We have at present no evidence to show how the change was affected. It may have extended over some generations, but in that case we should have expected to find an intermediate stage between Malta first and second races. Our present evidence, however, does not, unfortunately, cover that transitional period. It is possible that such a period may be discovered. On the other hand we have the possibility of the new influx of people exterminating, or nearly exterminating, the previous inhabitants, an event which is not without parallel in modern times. In North Africa the problem is somewhat different. Here the Armenoid peoples can only have represented a comparatively small element in the whole population, and we know that there are certain brachycephalic elements surviving till to-day. Again, the inhumation burials in Carthage which have as yet been explored are so few, and show so little variation in cranial form, that they may quite well belong to

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some definite section of the population. On the one hand we have on the mainland a series of settlers among a large indigenous population, and on the other hand we have a further band of settlers, on a small island, on which it is quite possible events occurred which would have been impossible amidst a large population.

We have not at present sufficient statistical material in early times to enable us to judge how far there has been a change in the standard deviations since the coming of the second race, which would enable us to say whether there ever was a time in Malta when a considerable mixing of races was taking place; and it must always be remembered that the second race may have been, at least in origin, considerably intermixed with Mediterranean blood before they ever ventured as far as Malta.

It cannot be denied that the second race has altered since its arrival in Malta; but just as in most parts of the Mediterranean, even at comparatively short distances apart, we find local divergences, it would hardly be surprising that we should also find differences in the time series, namely, that people of one age should show a slight physical difference from those of the other. The internal differences, however, in Malta appear to be but insignificant when compared with the differences between the Maltese and the other inhabitants of the Mediterranean, and it seems justifiable —at least for purposes of intensive study—to regard them as a Maltese sub-race.

Summing up their characters, they are distinctly long-headed, though hardly so long-headed as the Cretans, but nearly 10 mm. longer than the Cypriots; they are broad-headed, having about the same head breadth as the Cretans, and a greater breadth than the Cypriots. The change since ancient times has operated both in shortening the length and increasing the breadth, the height of the cranium having remained constant. The face is much broader than in ancient times; the orbits are higher and narrower: the nose longer and broader, so that the nasal index is not appreciably altered.

The Mediæval skulls in the Chapel of Bones presented characteristics similar to those of the skulls in the modern ossuaries. Although some variation occurred, as might be expected in a series which might contain a number of foreigners, the standard deviations are sufficiently small to suggest that on the whole the skulls are those of adult males of a normal population. The standard deviations are, indeed, smaller than those of the series from the modern ossuary. Both series, from the Mediæval Chapel of Bones, and from the modern ossuary, are large in size—that is to say, absolutely long, high, and broad; in the majority, the brow ridges are very well developed, and there are other indications of considerable muscularity. It is possible that some of the skulls, on the sex of which it was not possible to express an opinion, may be males of Mediterranean origin, as these latter appear as a general rule to be smaller. A few appeared to be Negroid.

Although skulls which presented Negroid characters were not uncommon from Saracenic—possibly earlier, and certainly later—graves, the Negro element in the

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144 [567] population does not appear to be very great. Slaves were, we know, introduced in large numbers by the Knights of St. John, and a fine old building still remains in Valletta as a witness to the number of Negroes kept in captivity, but yet there appears to have been great segregation. The Turk in Cyprus seems to have been more merciful to his slaves than the Christian in Malta, possibly because of the difference in the social systems. It is doubtful, therefore, whether the Negro element is more than a negligible factor in Maltese ethnology.

Cases certainly occur, in all periods, of extremely long skulls of the hypsistenocephalic type of Giuffrida Ruggeri. Some of these specimens appeared on a careful examination to present Negroid characters; the majority seemed to be well within the range of normal variation of the ordinary Mediterranean type. If mixing with Alpines immediately raises the standard deviation of Mediterranean man, it is to be expected that a mixture with Negro or Proto-Ethiopic would have the same effect; without definitely denying the possibility of this type in Malta, it would seem a more reasonable hypothesis to suggest that those crania which present a combination of the characters of a long head with considerable prognathism and a wide nasal aperture probably belonged either to actually imported Negroes or to their descendants.

Although the census figures show a different result, it is of interest to note that among the people who presented themselves for measurement in villages or institutions, practically all the foreigners came from the Barbary coast.

[563] There can be little doubt that there has been considerable Italian influence in the island for a long period, and we have already shown that at the present day the largest resident foreign element apart from the garrison is Italian. It seems possible that the same influences, whatever they were, which made it possible for the early population to be swamped by the present type, have also made the latter immigrants, of a type similar to the Neolithic people, unable to stand against the domination of the sub-race (Malta second race) now established in the island.

144 563 A question of considerable importance from the practical point of view is whether there is any essential difference between the Maltese and the nations of Western Europe, who, either singly or collectively, have occupied the island since the Middle Ages. Social distinctions have operated during the whole time, but there is evidence to suggest that the Knights may have considerably affected the population, especially that of Valletta. Some of the people of Rhodes, who followed the fortunes of the Knights when the latter were driven from the Eastern Mediterranean, settled in Malta. Mercenaries were employed by the Order, and in some cases never returned home. In later times also, the Knights' vows of chastity, never very strictly adhered to, were entirely neglected, and their illegitimate children, whose fathers were predominantly French, contributed a considerable element to the population (28, p. 46). It is probably to such influences that we owe those crania in the Chapel of Bones which appear to show Nordic affinities.

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The stay of the French in the island was too short to have any effect on the population. A social barrier has been built up between the British and the people of the land, and the general impression gained is that, though there are a certain number of mixed marriages, there cannot, even after three generations of a large, if floating, British element in Valletta, be more than a very thin British strain in the population.

We have shown, in dealing with the history of the island, how extremely difficult it is to account for the wholesale immigration of an Armenoid-like population at any period. We have also shown how, in spite of the continual immigration of people of the Mediterranean stock, the Maltese type (*i.e.* Malta second race, displaying Armenoid characters) appears to have persisted for a long period. It would seem, therefore, a point worthy of further consideration, whether the development of the Maltese along the lines they appear to have followed may not be due to certain definite geographical factors of whose influence we are as yet unaware. It is possible that if we had at our disposal a long unbroken series, instead of larger or smaller series from Neolithic, Mediæval, and modern ossuaries, we should not find such striking contrasts as we do at present. Anthropological data from various parts of the Mediterranean show that there is very often a significant difference between two villages in different valleys of the same mountain range. It is possible that even the few generations which have elapsed between the building of Hal Tarxien and 1921 may be the equivalent, in time, of such a journey in space, and certain big changes may have taken place owing to changing geographical conditions. There can be little doubt that the climate of Malta has changed very much, not only since the first terrace was cut in the Weid Dalam, but even since the formation of the second terrace. We have also suggested that the evidence from Professor Zammit's excavations at Hal Tarxien hints at a change in climate since Neolithic times. The change in the structure of the population may be due, therefore, partly to geographical as well as to historical causes.

Whether or no the development of the Maltese sub-race is due to particular geographical conditions, there can be little doubt that, in Malta at least, the strain is biologically remarkably successful and extremely fertile. In spite of the high infant mortality which has existed in the past, they have continued to increase, and the modern developments of hygiene and the care of infants are likely to make the increase still more rapid. If the overcrowding continues, in a comparatively short time we shall be faced with conditions in the island which would appear to be, biologically speaking, unsatisfactory. Sanitary conditions can be improved, food can be imported, but excessive overcrowding may bring its own remedy, either in disease or in a diminished fertility. The present fertility is quite possibly due to some underlying climatic condition. In spite of lack of water, Malta has long been extremely fertile botanically, and was famed for this in classical times. The Maltese goats, by far the most abundant large mammal of the island apart from

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man, are also unusually fertile, and the females possess remarkably developed udders. Possibly similar causes make both man and the goats fertile. If this is so, emigrants from the island will probably, after a short time, lose their fertility,[1] whilst the only limiting factors on the island itself will be space and the food and water supply.

Summarizing our general conclusions, the race in Malta which is associated with the period of great megalithic buildings—a cultural stage we have termed "Malta Local Neolithic"—appears to be closely akin to the Mediterranean race. This is our "Malta first race." At a later date, possibly towards the end of the Bronze Age, but more probably during the Early Iron Age, Malta was peopled by a race with different characteristics, our "Malta second race." These people are of Armenoid type, but probably have an admixture of Mediterranean blood. Their origin appears to be the Eastern Mediterranean. They may have come to Malta either directly or by way of Carthage. They may have destroyed the previous inhabitants, or they may merely have pursued methods of peaceful penetration. This race has firmly established itself in Malta, and all subsequent introduction of foreign blood has failed to raise the variation. During the course of years certain changes have taken place; there are also certain local variations, but the differences between Malta and Gozo are not greater than the differences between the general population of Malta and at least one, and possibly more, of the more isolated villages.

APPENDIX I.

LITERATURE.

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[1] Of interest in this connection is the fact that there is at present a Maltese colony in Detroit, U.S.A., and it will be instructive to observe whether, amid alien surroundings, the strain is able to perpetuate itself and to retain its fertility.